

## OFFICIAL RULES FOR 2012 JPL INVENTION CHALLENGE

The JPL Annual Invention Challenge is ready for its fifteenth year. The title for this year's contest is the **"Streaming Tissue Toss Contest"**. The objective and rules are listed below. Questions related to this contest should be directed to: Paul MacNeal at work phone (818) 354-7824, FAX (818) 393-5886, M/S T1707, located in Building T1707-103, or e-mail to [paul.d.macneal@jpl.nasa.gov](mailto:paul.d.macneal@jpl.nasa.gov).

**OBJECTIVE:** Create a device that propels a provided roll of tissue paper such that the tissue unravels in mid-air and creates a long unbroken stream. Each team will be allowed to operate their device twice. The winner will be the team whose device propels the roll and creates the longest unbroken stream of tissue paper.

### Rules:

#### ELIGIBILITY

- 1) The contest is open to all JPL employees, contractors, and immediate family members. The contest is also open to teams of students from Southern California middle schools and high schools providing that they have completed all required forms as outlined in rules 3 and 4 below.

#### REGISTRATION – JPL PERSONNEL

- 2) Applications for JPL employees, contractors, and immediate family members entering the contest (found on website) must be filled out and submitted to Public Services prior to midnight November 15, 2012. Completed entry forms should be directed to Public Services at FAX (818) 393-4641, or sent via email to [Rhonda.M.Dash@jpl.nasa.gov](mailto:Rhonda.M.Dash@jpl.nasa.gov). An entry form is included at the end of the rules. All entries will be time stamped based upon the time received. Only the first 20 JPL/contractor entries will be permitted to compete. Five alternates will be accepted in case some entries withdraw prior to the competition.

JPL employee family members and friends are welcome to watch the contest, but must be cleared through the security office prior to arrival. JPL employees must fill out the visitor request form as found in the link: <http://protective-services.jpl.nasa.gov/visitrequest.html>

#### REGISTRATION – SCHOOLS

- 3) **Note: This section has changed from previous contests. Please read carefully!** In order to make it easier to process badging at JPL, each team must email their completed, typed entry form (found on website) to [Rhonda.M.Dash@jpl.nasa.gov](mailto:Rhonda.M.Dash@jpl.nasa.gov). Additionally, to make the badging process flow smoothly each team must **mail** a printout of their completed student team entry form and the "Authorization and Release for Photos and/or Video Recording" agreement form (found on website) for each person (student, guest, teacher, and chaperone) planning to attend the JPL contest. Each video release form must be completely filled out and signed. If the student is under 18 years of age, then their parent or guardian must also sign. **The emailed entry form and entire set of video release forms must be filled out and submitted to Public Services no earlier than September 4, 2012 and be postmarked no later than midnight October 6, 2012.** Completed forms must be mailed to Public Services at Jet Propulsion Laboratory, M/S 186-113, 4800 Oak Grove Drive, Pasadena, CA 91109. All entries will be time stamped based upon the time received. Student teams

will be notified to verify their acceptance into the contest by October 10, 2012. Questions regarding the entry forms can be directed to [Rhonda.M.Dash@jpl.nasa.gov](mailto:Rhonda.M.Dash@jpl.nasa.gov) in Public Services at (818)354-0112. Each school is allowed no more than three teams. Internal school competitions are encouraged to select the top three teams if necessary.

Any foreign student (18 or over) or adult will need to fill out a special form which is processed by the Public Services Office. The process takes nearly three weeks; therefore, if you plan on attending the contest at JPL, and you are a foreign national, it is important that you contact Public Services prior to November 9, 2012.

**Additions or corrections to the registration forms and/or video release forms need to be mailed to the Public Services Office with a postmark no later than Thursday, November 17, 2012. Faxed forms will not be accepted. Failure to send in the signed video release form by the requisite time will prevent participation and access to the JPL contest for those students that fail to comply with this request.**

#### SPECIAL RULES FOR SCHOOL TEAMS

- 4) Only the first 75 student team entries will be permitted to compete at the regional competitions. Student teams will compete at a regional competition held on Saturday, November 10, 2012 at either Augusta Hawkins High School in Los Angeles or Orange Coast College in Costa Mesa. Details for the regional competitions will be sent to all registered teams. The top five teams with the highest score from each regional competition will be invited to compete at the JPL contest held on Friday, December 7, 2012 (see Rule 5 below). In addition, the next 10 teams with the highest scores between both regional competitions will also be invited to compete at the JPL contest.

#### LOGISTICS

- 5) The date and time for the final contest is Friday, December 7, 2012 between 11:30 AM and 1:00 PM. The contest is held at the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, CA 91109. The contest area is located north of the fountain area, in front of the Administration Building (Bldg. 180) steps. In the event of heavy rain (more than mist), the contest will be held indoors with a ceiling height of only 17 feet. Check-in for the event will begin at 10:15 AM.

#### DEVICE RULES

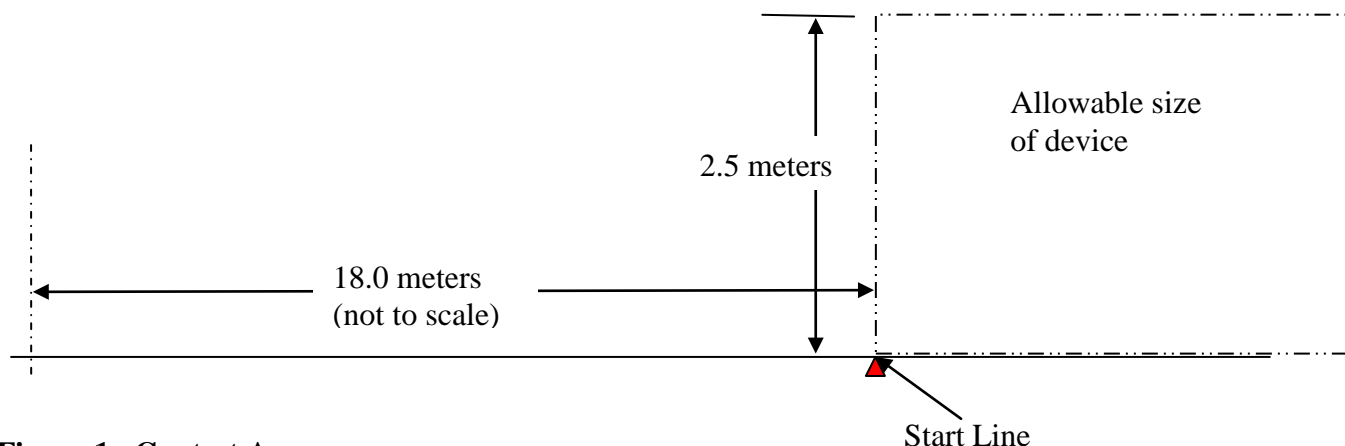
- 6) The device must have the following characteristics:
  - a. Be capable of propelling a roll of tissue paper (see Rule 6c for details) through the air and have the roll unravel to produce a long continuous stream of tissue paper. The roll should land within the 14.8 foot wide landing area. Rolls that go out of bounds while still in the air will be marked where the roll crosses the boundary line (see Rule 8 "Scoring" for more details). The field judge decision is final.
  - b. Be capable of operating twice within a one minute time period. Teams are

allowed to attempt two tosses of the tissue paper using new rolls of tissue paper for each attempt. Resetting the device is acceptable.

- c. Be able to accept a roll of tissue paper. Two rolls will be supplied by the contest host upon entering the tossing area. Each roll is a Charmin Brand Double roll of Ultra Strong tissue paper. The approximate weight of the Double roll is 79 grams (2.8 ounces). The roll has a total unraveled length of approximately 17.9 meters (58.7 feet). The width of the roll is 10.8 cm (4.27 inches). The approximate diameter of a full roll is 11.4 cm (4.5 inches). No alterations in any manner can be made to the tissue roll.
- d. Be able to stay behind the start line at all times (before, during, and after each toss).
- e. Be no taller than 2.5 meters and no wider than 2.0 meters before, during, and after each toss.
- f. Utilize safe energy sources. Examples of disallowed energy sources are chemical explosions, caustic gases, and rocket motors. High pressure gas systems and other questionable sources must be cleared through Paul MacNeal and the Safety Coordinator prior to performing at both the regional contest and the final contest.
- g. Be initiated by a single operation (cut a string, flick a switch, pull a pin, etc) provided by the contestant. No human power may be used to add dynamic or potential energy to produce motion in the device. All stored energy systems must be energized prior to starting the task.
- h. Be made from any materials as long as they are non-toxic and safe.
- i. Place the official entry number provided by the contest organizer (3" high numbers or larger) on at least two sides of the device for easy identification.
- j. Not use any clamps, tape, or any other means to attach to the ground. The device must only rest on the ground, however heavy weights may be used.
- k. Be able to adapt to non-level ground (see Rule 7).
- l. Note: A maximum of 2.0 meters (79 inches) of tissue may be unrolled when placing the roll in the device. The free end of the tissue may be anchored to the device.
- m. **SPECIAL RULE FOR SCHOOL TEAMS ONLY:** To avoid plagiarism, each team that competes at the regional contest will have photographs taken of their device. The basic concept of the device (energy source, toss method, size) must be maintained. The regional contest host will mark the device in an identifiable manner to confirm authenticity at the finals. Minor modifications to the device are allowed within these constraints.

## CONTEST AREA DESCRIPTION

- 7) The contest site is located in front of the steps leading to Building 180. The site will contain two side-by-side areas each 2.0 meters wide for setting up and operating the device. The ground is concrete with a rough finish and has a slight slope. The width of the landing area is 4.5 meters (14.8 feet). The length of the landing area is 18.0 meters (59 feet) from the start line. See Figure 1 for a description of the contest area.



**Figure 1. Contest Area**

### SCORING

- 8) The length of streaming tissue that is recorded for each toss of the tissue roll is calculated as follows:
  - a. The roll must propel through the air. When the roll first contacts the ground, spotters will mark the contact point on the ground. If a roll goes out of bounds an “X” will be placed on the boundary where the roll went out of bounds and 36 inches (3 feet) of length will be deducted from the overall measured length. The stream of tissue may break upon contact with the ground. If the streaming tissue breaks in mid-air (unlikely), then only the unbroken length of the stream that stays with the roll will be counted for the official length.
  - b. The field judge will determine where the unbroken streaming tissue begins. The beginning of the stream should be marked as soon as it contacts the ground (especially if there is a light wind present). The field judge decision is final. If the roll has been anchored at the device, the starting point for the beginning of the unbroken stream will be at the starting line where the stream crosses the starting line.
  - c. The straight-line distance on the ground between the beginning of the unbroken streaming tissue and where the roll first contacts the ground will be measured to the nearest  $\frac{1}{4}$  inch.
  - d. The distance for each allowed toss will be recorded on the score sheet, but only the longest distance is used to determine a winner. In the event of a tie, each team will be allowed to have one additional toss with the team having the longest unbroken streaming length being declared the winner. The same setup rules apply.

### CONTEST PROCEDURE

- 9) The order in which teams will participate is selected by a random process. The team will be given a two minute period of time to set-up their device. Strict time limits will be imposed to ensure that all contestants are able to operate their device. At the beginning of the time period each team will be given two rolls of tissue. The team is responsible for placing the roll of tissue inside their device for each attempt.

Each team shall designate a speaker to talk about their team and their device during the setup

period. The team will be asked if they are ready to proceed with their toss attempts. The official starter will check the wind speed indicator and determine if the wind is low enough to start the one minute tossing period. If conditions are good then the official starter will give a countdown (3....2....1....GO!) for the start of operation for the device. The timer will start the time at the starter's direction. Each team is allowed to initiate their device to propel the roll of tissue. Once the first roll of tissue has landed, the team is allowed to reset their device and place another roll of tissue into their device. The team may then toss the second roll of tissue. The timer will shout out when the sixty second (one minute) time limit has been reached. If the roll of tissue is in the air before the sixty second time is announced, the score for that toss will count. If the wind picks up speed, the official starter, at his/her discretion may temporarily halt the one minute time tossing period until wind conditions are good, at which point the timer would resume the one minute tossing period.

Three or more spotters will be located in the landing area to determine where the roll of tissue first contacts the ground. The spotters will indicate contact on the ground with a chalk mark. The field judge will determine where the streaming tissue begins and will measure the straight-line length of the streaming tissue. The spotter's and field judge decisions are final. The field judge will indicate the length on the score sheet for each toss including any penalties for rolls that land out of bounds.

Once the lengths have been entered into the scoring sheet the team will be asked to remove their device and place it in a designated viewing area as directed by volunteers.

#### AWARDS

- 10) Trophies will be divided into two categories: JPL employees/family/contractor entries and school team entries. Trophies for longest unbroken streaming tissue length will be given for first, second, and third place for each category at all contests (regional contests and the JPL contest). Tiebreaker rules are given in Rule 8d. If teams are still tied, then the tied teams will be awarded equal trophies. Certificates will be issued for the lightest, heaviest, smallest, largest, most unusual, most artistic, and most creative designs.